FAA AVIATION NEWS

AUGUST 1971

COVER
It really is the heat, not the humidity, that can bring on summertime exhaustion. See page 6.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION VOL. 10, NO. 4

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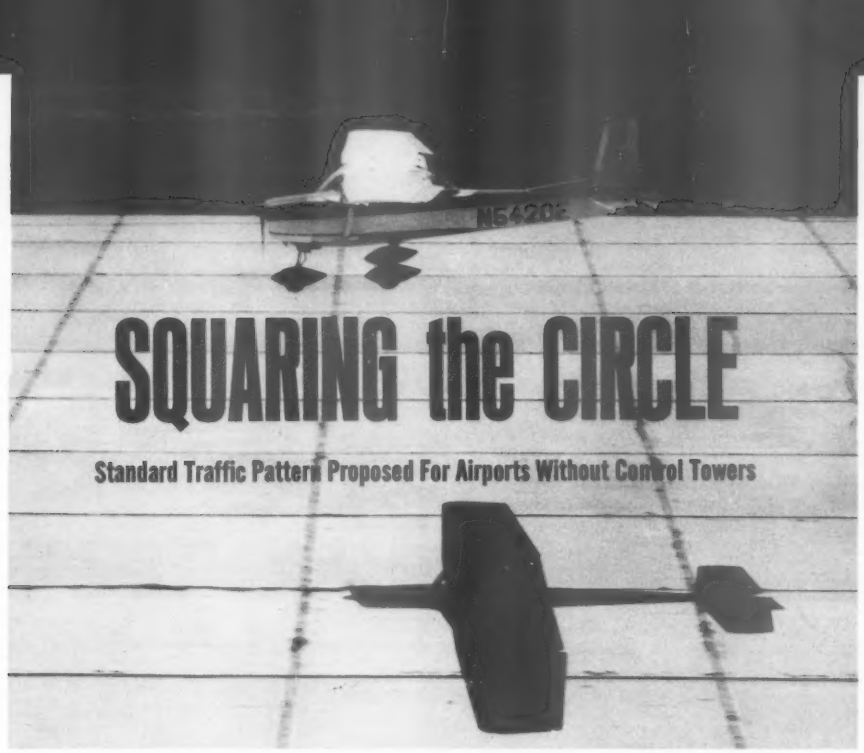


SQUARING the CIRCLE

Standard Traffic Pattern Proposed For Airports Without Control Towers

FAA is proposing to establish standard traffic rules for all aircraft approaching to land at airports without control towers.

Designed to promote a safer and more efficient flow of traffic, the proposal would require all aircraft to enter the pattern in a specific manner and at the same altitude. It would also limit airspeed and prescribe the direction of both takeoff and landing.

Present regulations require only that aircraft arriving at uncontrolled airports make all turns to the left, unless light signals (flashing amber light at segmented circle) or visual markings indicate that turns should be to the right. Normally, pilots at these airports fly a rectangular traffic pattern, with smaller and slower aircraft at about 600 to 800 feet altitude and larger and heavier aircraft at about 1,200 to 1,500 feet; however, in VFR weather pilots are at liberty to approach and land in any manner which appears to be consistent with safety under prevailing conditions. This includes straight-in approaches.

At present there is no specific speed limit at uncontrolled airports except that aircraft operating under 10,000 feet are subject to a 250 knot (288 mph) restriction.

The FAA proposal is based on the recommendations of pilot groups and FAA's own studies which indicate that additional regulations may be required at non-tower airports to insure the safe and orderly movement of air traffic. Studies of general aviation mid-air accidents have shown that a majority—about three out of every five—of these occur at uncontrolled airports, in VFR weather, at some phase of the landing procedure.

FAA recognizes that it may eventually be necessary to establish rules for departing aircraft and other aircraft in the vicinity, but the current proposal is limited to the following considerations which would affect only arrivals (except insofar as the "active" runway affects departures):

The Traffic Pattern. The new proposal officially establishes a rectangular pattern consisting of upwind, crosswind, downwind, base, and final approach legs. Pilots would enter the traffic pattern in level flight *on or prior to the downwind leg*. The entry could be either tangential to a corner of the rectangle or straight-in on any leg except the base or final approach leg. *All turns would be in the indicated direction of the pattern*—this includes entry turns. Straight-in approaches to the landing runway would be prohibited except in cases where the pilot has an ATC clearance and is making a standard instrument approach.

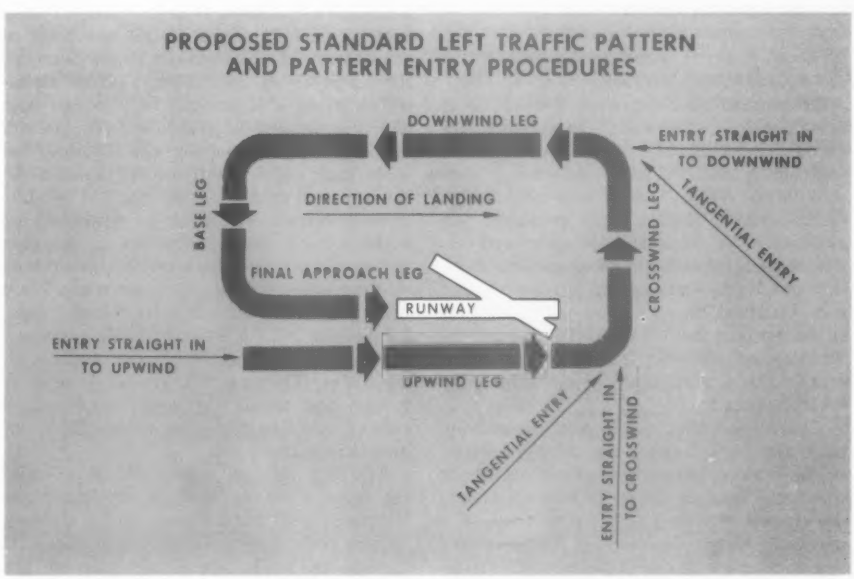
At present a generally accepted practice at non-tower airports is to enter the traffic pattern at a 45° angle to the downwind leg. This procedure is considered less desirable than the proposed procedure because it requires the pilot to bank his aircraft away from the pattern, thus obscuring his view of other traffic in the pattern. Straight-in entries to the upwind, crosswind or downwind legs would eliminate this problem.

Pattern Altitude. The proposal would establish a single altitude of 1,000 feet above the airport elevation for all aircraft in the traffic pattern, up to the point where further descent is required for a safe landing. FAA believes that requiring all aircraft to be on the same eye level provides pilots with greater opportunity to see other traffic than does the variable level procedure. VFR aircraft would operate at less than 1,000 feet when required to do so to maintain the applicable distance from clouds, or where unusual topography or operating conditions required a special pattern to be designated.

Choice of Runway. Since the flow of traffic in the patern will be related to a given runway (rather than to the airport) the rule would require pilots to land and take off on the runway most nearly aligned into the wind or, when the wind is less than five knots, to use the "calmwind" runway (where designated on sectional charts and in the AIM). However, the pilot would retain final authority and responsibility for the safe operation of his aircraft and could select another runway if required for safety.

Maximum Airspeed. A speed limit of 156 knots (180 mph) also would be imposed on all piston engine aircraft in the ptatern. A 200 knot (230 mph) restriction would apply to turbine-powered aircraft.

Comments on the FAA Notice of Proposed Rule Making (Docket No. 11233; Notice No. 71-20) should be submitted to the FAA, GC-24, 800 Independence Ave., S.W., Washington, D. C. 20590. Deadline for comments is September 27, 1971. ■



The magic word at busy terminals like Chicago's O'Hare Tower these days is "ARTS," Right—radarman Philip F. Jones, who tells what ARTS will mean to pilots and controllers.

ARTS and TOWERS

Editor's note: Within the next two months FAA's long-heralded Automated Radar Terminal System (ARTS) will become operational at Chicago-O'Hare, the first of many control towers that will be using the standardized system known as ARTS III within the next year. In this article Philip F. Jones, a journeyman controller at the Atlanta tower, where automated tracking and alphanumeric displays at terminals were first introduced on a development basis six years ago, describes how the many advantages of the new system over "old-fashioned" radar control will speed up the traffic flow at busy airports and reduce the possibility of midair collisions. The term "alphanumerics" as used here by Controller Jones means a display consisting of letters and numbers.

I hope I never have to control traffic again without ARTS.

Occasionally, it's necessary for ARTS to be taken from controllers, temporarily requiring us to go back to the "old way" of controlling traffic. What a difference!

Without ARTS, controllers are always under greater tension and pressure. We must rely on mental association and repeated communication with aircraft to make sure the planes we're controlling correspond with observed blips. Sometimes controllers exchange information across the room via the intercom. There's a lot of flight data to be kept in mind, particularly when controlling several aircraft.

Controllers' eyes are constantly moving back and forth from scope to flight strips. In the interval between a look down at the strips and back to the scope, there's always the chance of temporarily losing track of a particular target, especially if the controller has a number of aircraft in trail. So he must get positive identification, through voice communication, a time-consuming process.

With ARTS, it's an entirely different matter. Controllers no longer have to keep looking down at flight strips and back to the scope—all the data are right there on the scope. They appear on a small alphanumeric tag that travels right along with the blip representing the aircraft. There's absolutely no chance for mis-identification since each tag is unmistakably attached to the appropriate blip.

And there's no need to communicate verbally with other controllers to get data on other aircraft. With ARTS, this is done without a word being spoken. When I see other targets on the scope for which I need information, a flip of the "quick-look" switch can show me any radar position in the room. The tags tell me all I need to know—and there's no need for time-consuming conversation and no possibility of misinterpretation.

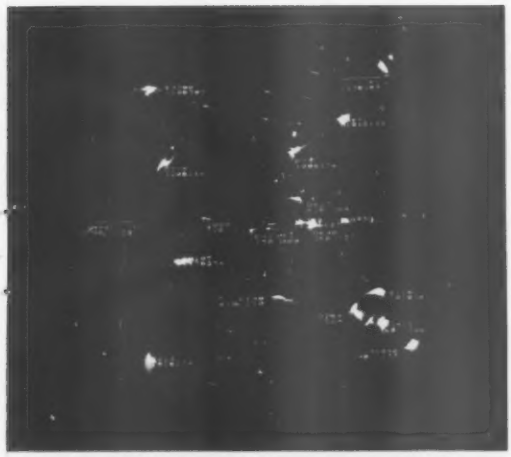
Symbols on the tags indicate whether the blips represent arrivals or departures. Numbers and letters denote flight number, beacon code, altitude and ground speed. If I want to know where any aircraft I'm tracking will be in a minute from now—or two, four, or eight minutes from now—I activate a control on the console and that information appears in the form of an extended line.

Using the proper modes, the beacon system—an integral part of ARTS—has a capability of simultaneously identifying over 4,000 different aircraft. The beacon system also provides altitude information direct from the aircraft transponder.

Data on scheduled airline departures and arrivals are fed into the computer several weeks in advance. Thirty minutes before each arrival and ten minutes before each departure, the stored data appear automatically in alphanumerics on the appropriate scope.

Information on flights whose data are not stored in the computer—such as nonscheduled or general aviation flights—is obtained through voice contact, and fed by the controller into the ARTS system by punching it out on an alphanumeric keyboard similar to a typewriter keyboard.

Aircraft handoffs between controllers responsible for different sectors within the facility are completed without a word being spoken. When a plane is being handed off,



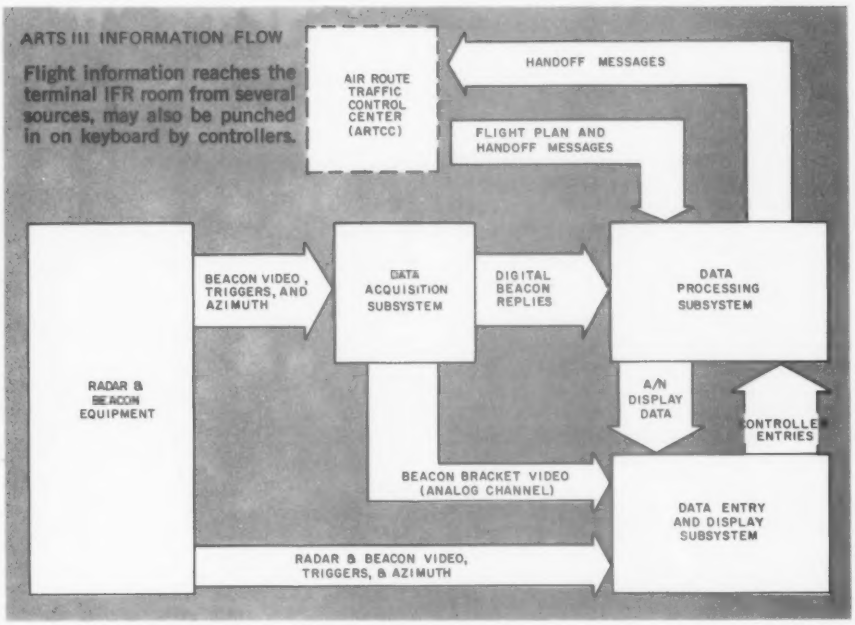
Above—radarscope showing ARTS alphanumeric display. Below—old style handwritten flight strips, and flight strip printer.

a conspicuous dotted line appears alongside its blip. Using the track ball to bring the bright slew dot over the target causes the dotted line to disappear, signifying radar contact and acceptance of the handoff. This totally eliminates verbal exchanges between the receiving controller and the handoff controller.

ARTS relieves the controller of a number of time-consuming tasks, freeing him to make vital control decisions. It also gives him time to make observations that improve his skill as a controller—such as rates of climb and performance of various types of aircraft.

The advantages of ARTS are sharply brought home to controllers when the system is suspended for "de-bugging," program changes, or other reasons. Recently, it was discontinued for about ten minutes while I was controlling seven aircraft. It was back to the flight strips—and I had to concentrate about three times as hard under the old method.

ARTS gives controllers the ability to handle a much greater volume of aircraft without greater difficulty. I certainly wouldn't want to go back to flight strips and quick glances. ■


ARTS III INFORMATION FLOW
Flight information reaches the terminal IFR room from several sources, may also be punched in on keyboard by controllers.
AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)
HANDOFF MESSAGES
FLIGHT PLAN AND HANDOFF MESSAGES
RADAR & BEACON EQUIPMENT
BEACON VIDEO, TRIGGERS, AND AZIMUTH
DATA ACQUISITION SUBSYSTEM
DIGITAL BEACON REPLIES
DATA PROCESSING SUBSYSTEM
A/N DISPLAY DATA
CONTROLLER ENTRIES
BEACON BRACKET VIDEO (ANALOG CHANNEL)
DATA ENTRY AND DISPLAY SUBSYSTEM
RADAR & BEACON VIDEO, TRIGGERS, & AZIMUTH

ATC AUTOMATION GLOSSARY

ARTS—An acronym for "Automated Radar Terminal System." ARTS applies only to the terminal (radar approach/departure control) portion of the automated system.

ARTS-I—The initial ARTS system which was installed at the Atlanta Tower radar control room beginning in 1964. That ARTS system, the first to go into operation, was commissioned in 1966.

ARTS-II—This is a scaled-down, non-tracking version of ARTS-III, designed for installation at the less-busy terminals.

ARTS-III—The advanced system for terminals. This system makes possible positive identification of beacon targets on terminal displays through alphanumerics. The alphanumeric presentations provide the identity, altitude, speed, range and other data on beacon equipped aircraft entering or leaving the terminal area.

NAS EN ROUTE STAGE A—The term for the system of automation applying to the en route (ARTCC) portion of the total automated system.

CUE—An acronym for Computer Update Equipment. A typewriter-like keyboard and display tube provides controllers with a means of communicating changes and other information to the computer.

FAIL SAFE—This refers to the concept of building sufficient capacity into the computer to assure that all functions will continue to be performed at the rate required for safe operation even though some modules may be inoperative.

FAIL SOFT—The condition which exists when failures in a computer have occurred to the extent that full fail-safe operation is no longer possible, but operation is still available on a limited basis—with less than full capability.

ARTS III Partial List of Operational Dates*

10/71	Chicago-O'Hare
3/72	Washington National
	Boston
	Detroit
	Denver
	Philadelphia
	St. Louis
	Pittsburgh
	Cleveland
	Minneapolis
	Seattle/Tacoma
4/72	Miami
	Honolulu
	Santa Ana, El Toro Marine Corps Air Station
5/72	New Orleans
	Cincinnati

*These dates are not necessarily for commissioning. The need for additional space will involve some relocations, adding to the time of operational readiness before commissioning.

Cooling Off Hot Pilots

When you've spent a hot summer's holiday on a pack trip in the mountains of Idaho, you really know what wilderness living is. You are apt to come out with a lobster-red sunburn as well as a creel full of trout and a weariness in your bones that augurs well for a really refreshing slumber. You may also have developed, unknowingly, a degree of dehydration that could lead to a state of collapse at a critical moment—when you are about to fly your party back to the big city.

This is what happened to a professional helicopter pilot recently who took a busman's holiday by flying a Mooney *Ranger* from Boise to the Salmon River Mountain area for a pack trip into a trout fisherman's paradise. The pilot, 47, had nearly 8,000 hours of air time, most of it in rotor craft. He was accompanied on the trip by his wife and two friends.

The party left the airplane at a strip near Cascade, traveled in their guide's jeep 15 miles up to the pack station, and then took to the saddle. Three days later they emerged from the woods, tanned, tired, and full of happy memories. They were also pretty thirsty, since the arid summer had dried up the creeks along their way and they had been dependent on canteens since leaving their lakeside camp early that morning.

There was water stored in the jeep, but it tasted pretty flat and tepid, and after one mouthful the pilot decided he would save his thirst for something cold and frosty back in Boise, only an hour's flight away.

When the jeep brought them to the airplane, the pilot seemed to have some difficulty getting to his feet, and the guide asked him several times if he was all right—he seemed to bump into the wing as he made his way slowly around it on a preflight inspection.

The pilot insisted he was fine—just had a little cramp in his leg from the tight quarters in the jeep; it would soon be gone. He loaded his party into the aircraft where, owing to the fierceness of the afternoon sun, the inside temperature was over 100°. Keeping the door open while he ran through his pre-takeoff list helped a little but not much. His wife, who read off the list for him, found him slow to respond and had to repeat several items loudly.

Maybe you cannot wait to jump into the water the moment you land on your vacation lake or bay, but you had better not take off immediately after visiting Davy Jones' locker.

Then he taxied rather bumpily over to the airstrip and lined the airplane up with the runway. Just as he was about to open the throttle, his wife saw him clutch his stomach and slump forward. Somehow he managed to find the ignition switch and shut off the engine before he collapsed.

When he revived a few minutes later, he was lying in the shadow of the airplane's wing, being ministered to by his wife, friends and the guide, who had brought out the jeep's water supply. This time the pilot drank willingly and swallowed several salt tablets as well. Within half an hour his cramps and other symptoms of heat exhaustion were gone. But it was at least two hours before the flight was resumed, by which time everyone had rested and restored much of their missing body moisture.

Nobody said anything about what might have happened if the attack had come after he had opened the throttle. Sometimes it takes a close call of this nature to make pilots believers in the vulnerability of the human body to water loss, or dehydration. The human body is made up of about two-thirds water; a loss of less than 5 percent of this water under certain conditions can bring on drowsiness or nausea; a greater loss can produce dizziness, headache, difficulty in breathing, etc. A significant salt loss along with dehydration can result in muscular cramps anywhere in the body. The condition known as heat exhaustion is a state of collapse brought about by insufficient blood supply to the brain, following a period of heat stress.

Heat exhaustion is not likely to occur because of flight duties, but it may well overtake a pilot in flight after a day of recreation in the sun—a day's fishing in an open boat, for example, could bring it on, if sufficient drinking water has not been provided. In this age when fewer and fewer natural sources of unpolluted water are available, it is not unusual for the sportsman/pilot to find himself surrounded by water that is not safe to drink. Canteen water may not be very palatable, and insulated water jugs are heavy things to lug around, but some means must be provided to replace the continuous loss of water—the body's natural coolant—in hot weather.

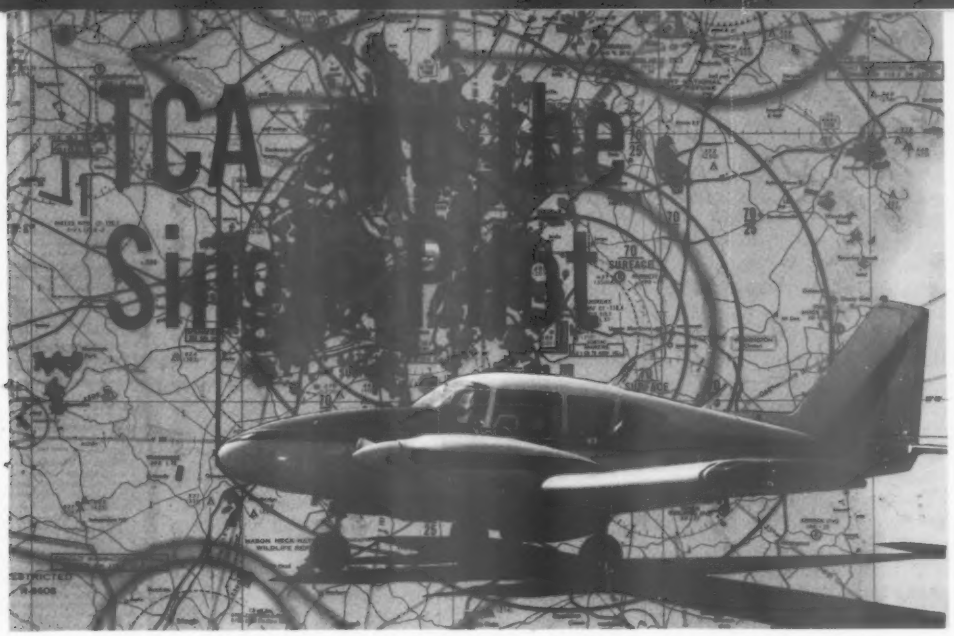
Engaging in rigorous exercise in hot weather speeds up the loss of water tremendously. The sweat rate of men doing heavy work—or playing a hard game of tennis—under very hot conditions is as high as two quarts per hour, and the concurrent sodium chloride loss may be equivalent to the entire normal day's intake. This water loss is not always made up by drinking water.

Individual tolerance to dehydration varies, although it is a fairly well established fact that no one can live much beyond three days without water. No layman can accurately interpret the symptoms that indicate the onset of heat exhaustion; but no pilot should attempt to fly an airplane directly after any prolonged activity in the sun that may have had dehydrating consequences. Even where no obvious debilitating effects appear, a loss of mental initiative can be expected, and this is not a good frame of mind for safe flying.

Incidentally, if scuba diving is on your vacation itinerary, you had better program it well before your intended departure in an airplane (preferably overnight). Otherwise the difference in air pressure as you climb rapidly to altitude could bring on an attack of the "bends" (muscular cramps). This applies to everyone in the airplane, of course, but most importantly to the man in the left hand seat. ■

Water, water everywhere—but salt water is no answer to thirst and the "fresh" water stream that is safe to drink is becoming rather scarce.

To avoid dehydration from too much sun, take advantage of natural (and aeronautical) shade.



Can a single pilot flying VFR find happiness with a TCA?

The Terminal Control Area concept has been decried by some as an over-elaborate maze designed to trap non-professional pilots of general aviation aircraft and frighten them away from high density terminals. The first TCA was established at Atlanta on June 25, 1970, and was followed later in the year by TCA designations at Washington, D.C., and Chicago O'Hare. In 12 months of operating TCAs the Federal Aviation Administration has polled thousands of VFR pilots who have used Terminal Control Areas as to the problems or advantages associated with them. The following interview appears to be typical.

Mike Munley, 57, proprietor of a busy downtown Washington restaurant, became a pilot by default. A concerned father (of seven boys and six girls) as well as a prosperous businessman, he has a habit of moving with the times. Observing the trend toward air travel, he decided to prepare his older sons for the age of aviation; three years ago he bought the boys a Cessna *Cardinal* and a program of flying lessons. When the boys' enthusiasm waned in the face of the learning disciplines involved, Mike decided to give them an object lesson in persistence and learned to fly the plane himself.

Mike's attitude toward learning to fly is characteristic of a self-made man. He logged over 40 hours of dual instruction before he was willing to solo, explaining that "I wanted to know exactly what I was doing every minute I was up there."

When you fly out of an airport like Washington National, one of the busiest in the world with an average of 80 operations an hour, that is a pretty good attitude to have. And when you fly with Mike Munley, you sense right away that he knows exactly where he is, what his airplane is doing, and what air traffic control expects of him. In three years of flying he has logged over 1,000 hours of air time, about half of it in the *Cardinal* before trading it for a Piper *Aztec*. Mike cautiously logged 60 hours in the light twin before turning his instructor loose. By that time, there was no question in his mind about his mastering the more sophisticated aircraft.

As far as Mike is concerned, TCA, far from being a burden, is the best thing that ever happened to general aviation from the point of view of safety.

"Knowing that *they* (the tower controllers) know where you are, and where the other guys are, makes all the difference. Otherwise you have to be twisting your head around like a loon, and you still aren't sure where everybody is. Of course, you need to have that transponder, and those radios, but who would be flying around in that kind of traffic without all the help he can get? He'd have to be out of his mind."

The TCA regulations for major hubs like Washington National require a clearance for all traffic penetrating the boundaries of the Terminal Control Area. VFR aircraft must carry prescribed communications and radio navigation equipment as well as a transponder, and student pilots are banned. Airspace access outside of the TCA is provided for aircraft operating in and out of adjacent general aviation airports.

The additional safety of air traffic control separation for VFR traffic is especially appreciated by pilots like Mike Munley at Washington National because of the predominantly jet traffic using the airport and because of the close proximity of Andrews Air Force Base and Dulles International Airport, with their wide body jets and military fighters. Traffic at DCA is also further hemmed in by the presence of a Prohibited Area to the northeast, and established noise abatement procedures on arrival and departure, which channel most of the traffic in the narrow corridor of airspace above the Potomac River.

Sharing a relatively confined airspace with this kind of company, a single pilot like Munley in a light-twin enjoys a sense of security in the TCA that was never possible before, when the environment contained a mixture of known and unknown aircraft (to the tower). Approaching Washington National, Mike feels that he has more time now than before the TCA was instituted to attend to his airplane and go through his pre-landing procedures. Mike is not a man who likes to skip over any of the items on his list. When he has no one in the cockpit to read off the list to him, which is often the case, he enunciates each item aloud clearly, and before he enters the final landing phase, he makes sure that all items are completed. Not that he neglects to look around for other aircraft, but his scanning can be done more efficiently when other traffic is reported to him by the tower. He knows that once he enters the 15-mile perimeter of the Washington TCA no unknown aircraft will be near him, unless he drops below the TCA floor. Within the seven-mile inner perimeter, TCA extends all the way down to the surface.

From Mike's point of view, flying in a TCA does not require a professional background in aviation or any particular educational level. The seventh grade was as far as he went in school formally back in Wilkes-Barre, Pa. After that, he knocked about from one trade to another until he found one that suited him, eventually becoming a successful insurance underwriter and latterly a restaurateur. He has always found himself to be capable of mastering whatever information he needed to do something he really wanted to do, and that sums up his attitude toward air traffic regulations in general and toward the TCA in particular:

"You've got to learn it right. Once you do, there's no problem." ■

Mike Munley, right, explains the TCA to his passenger. He likes being "looked after" by the eye of radar and the controller, feels the extra margin of safety is well worth the small inconveniences caused by the system.

Wheels over Water

The glide ratio of modern light planes is pretty impressive. Many twins will give you an honest 5:1 feathered props performance—five miles forward glide for every mile of altitude—and single engine aircraft will give you eight to one, or better. Nevertheless, nothing can be more misleading than bare figures on a chart, and the moment of truth, when the power unexpectedly does leave you during an overwater flight, can turn into a moment of wet embarrassment or worse, if you have not given the problem some forethought.

The first and immediate question that has to be answered when an engine dies over water is *which way?* Do you continue on, turn back, or veer off to one side—where is the nearest land? You *may* be able to see land, but then again you may be perfectly VFR with the loveliest haze over the water blotting out everything on the surface. This is no time to test your recall. . . .

. . . The overwater distance is 33 miles and I took off at 11:40 and my airspeed was 135 and the wind was 10 at 230 (or was it 320?) . . . anyway, it is now 11:59, minus about three minutes when the prop actually stopped . . . and if my heading was 115 degrees the reciprocal would be—oops, how did the airspeed get up over 150? . . .

If you are trying this at night or over water inhabited by sharks, the confusion in the cockpit can be considerably heightened.

The right emergency decision can be made only if the pertinent factors of time, airspeed and weather have been considered in advance, and a point of no return marked on the chart. You can also encircle buoys on the water and islands, but do not count on being able to see them.

Assuming you have made the best choice and you do arrive over the nearest land still airborne, what next? Do you try to stretch your glide to the airport, which happens to be several miles inland, or do you look for an open field? Given the high real estate value of beach property, open fields are disappearing near the shore; what you remember clearly as a cow pasture/baseball diamond last spring may have turned into a housing development over the winter.

Before you opt for the airport, face up to the question of whether you know where it is—i.e., have you actually flown into it before, at this season of the year? Many minutes may be lost finding an airport surrounded by haystacks. Depending on the type of aircraft you are flying, you may not have more than 60 seconds of searching time for every 1,000 feet of altitude you have left. You may find yourself, in the last remaining seconds, trying to get back to an unobstructed stretch of water.

One of the problems sometimes overlooked by pilots who like to believe in the old saw—"if I can climb out, I can always glide back"—is that in some light planes it is not true unless you are very lightly loaded. Consider, for example, the pilot who takes off from a shoreline airport in a Cherokee Six and climbs straight out at 800 feet per minute, with a best rate of climb airspeed in the neighborhood of 105 miles per hour. He is at max. gross with 3,400 lbs., and it is a very hot day. Supposing he has a power failure after two minutes, when he is at 1,600 feet, three and a half miles out over water. He would need a gliding ratio of almost 12:1 just to make it back to the beach. Many, but not all light planes have that ratio. To have an edge on safety, he would have had to gain some altitude circling over the field before setting out.

Flying over water at an altitude that gives you gliding distance to land is limited practically, of course, to relatively short stretches of water. If the distance from shore to shore is more than 60 miles, you are going to need some 16,000 feet of altitude, with a 10:1 glide ratio, to be within gliding distance of land at all times, and you are going to need oxygen for this kind of flying.

To shed some light on the practical possibilities of gliding to land with a dead engine, an FAA pilot, Don Byers, recently simulated several overwater emergencies over the lower Chesapeake Bay, in Virginia, flying a Cherokee Six known as the *Snark*. The trial flight was made between Hummel Airport, near the mouth of the Rappahannock River, to Kellam, near Cape Charles—a distance of 32 air miles. The overwater portion of the flight was 20 miles.

On departure from Hummel at 11:15 a.m., the wind was nearly calm and the temperature 70° (the temperature can be a factor, since the length of the glide is predicated on standard conditions and will be adversely affected by an increase in density altitude). The point of no return was established at 16 miles from the airport, approximately abeam of Tangier Island, to the north.

The nearest distance to land would be about 10 miles in either direction, requiring an altitude of at least 6,500 feet for gliding to land, according to the owner's handbook. As a safety margin, it was decided to establish an en route climb that would achieve a peak altitude of 8,500 feet at the midpoint, and attempt a simulated dead engine approach to land on the Cape. The aircraft was very lightly loaded—less than 700 lbs. for occupants and fuel.

Arrival at the midpoint was established on the basis of elapsed time, a matter of necessity since Tangier Island was lost in the haze and virtually no landmarks were visible. The best rate of glide (90 mph) was held from then on, with no change in course, and in just under seven minutes we were over the beach, with about 2,500 feet of altitude to spare.

This may sound like a comfortable margin, but in terms of time to maneuver, it amounts to less than three minutes. The shoreline at our immediate disposal was not at all inviting for an emergency landing so we chose to continue to Kellam Airport, a sod field four miles ahead. According to

A field of alfalfa can easily fool you into thinking you have found the sod strip you are looking for when you are down to your last 100 feet of altitude. Look for parked planes or a windsock before committing yourself.

our computer, our remaining glide range was four and a half miles.

If we had been locked in on our airport runway, we might possibly have made it, but the fact is we never saw the field until nearly ten minutes later, at which point our theoretically powerless airplane might have been smoldering in one of the hayfields that camouflaged Kellam from the air. We actually had to climb up to 3,000 feet before we located it. The object lesson of this flight was clear: if you have a choice (as we did) after an engine failure over water, go back to the airport you know rather than seek an unfamiliar resting place.

On the return flight to Hummel, with a light favoring wind, we decided to use 7,000 feet as a peak altitude and see whether we could glide to safety. We arrived over the nearest point of mainland, Stingray Point, with about 800 feet of altitude—enough for an emergency landing on a rocky beach or in a rough swamp near the shore, but not enough to reach the nearest open field. We assumed that we could have walked away from the airplane, but would not have enjoyed looking back at it. We concluded that we would be more comfortable with an extra 1,000 feet of altitude as a safety margin for "looking" while gliding to a landing.

There are several alternatives to holding an altitude that will let you glide clear of the soup, but all involve a risk of getting your feet wet. If you have a long stretch of water to fly over, you will contribute greatly to your own safety and peace of mind by carrying adequate survival gear, usually available for short rentals at waterfront airports. It is also important to keep close track of your position at all times so that should trouble develop and you have to radio for help, you will not present the search-and-rescue teams with hundreds of miles of ocean or lake to cover.

If you have to land on the water out of sight of land, try to go down near a boat so that a rescue effort is started at once. Make sure they actually see you come down; otherwise they may assume you are a low-flying fish-spotter or sightseer and pay little attention to your problems.

Although most pilots who fly over water even for short stretches carry emergency locator beacons, others prefer to rely on frequent (at least every ten minutes) radio position transmissions. Time can be very precious once you get into the water. In any case, filing a flight plan is a must.

The technique of landing a landplane on water is, like emergency parachuting, something you have to learn without practice. It is not going to be easy. With retracted landing gear, you have a better chance of remaining upright, but you can still catch a wingtip in a wave and flip the plane over. With fixed gear it is pretty hard to avoid dragging the wheels and nosing in: tail draggers are slightly better off in this respect.

The instinct of any flyer is to land into the wind, but at sea you have to take the water conditions into consideration. If the wind appears to be slackening (as evidenced by the lack of spray or foam) but the seas are still running high and heavy, you may do better to land parallel with the crests, if they are reasonably far apart or on top of the swells at a slight angle toward them, using the appropriate crosswind landing technique. Remember that the direction of movement of the water does not always coincide with the wind direction, but may be affected by landforms or undercurrents. You may have only a few seconds to make your decision—but once you do, go right on down. Do not second guess.

The final approach to a forced landing on water should be established with a minimum glide speed and full flaps. Water is an unbelievably solid substance when you hit it going 60-80 miles an hour, so you want to shave everything off the force of impact that you can. Everyone in the airplane should be wearing life vests, complete with dye markers and shark repellant (the landing jolt may cause incapacitating injuries), and those not piloting should protect their face with a cushion. Tighten seat belts and shoulder harnesses. Move passengers and baggage aft, to help you bring the nose up.

Some pilots feel that the ideal water landing with a wheel airplane consists of a full stall executed about three feet above the surface. Others consider it better to come down slightly above stall speed in order to retain control of the aircraft. If you stall too high, the nose will drop in; if you hit the water without stalling, the main gear will drag and probably cause you to pitch over. It helps a lot to have had some recent practice with power-off stalls and landings.

Work the rudder and ailerons to level the wings right up to the moment of impact—and beyond if you bounce, as you probably will. Expect a lot of noise and a blinding spray as a matter of course, and do not panic: you will have at least three to five minutes before the aircraft sinks, longer if damage is slight and tanks fairly full. Some pilots recommend unlatching the door(s) at the last moment of flight, to prevent jamming. Others prefer to open a vent so that water can enter the cockpit readily and reduce some of the pressure against the door. If you have to, you can smash the plexiglass window and exit through it. Do not try using your airplane as a raft; it is bound to sink and you want to be well away from it when it goes down.

The more you consider the problems of putting a landplane down on water, the more sense it makes to take precautions to avoid this kind of emergency landing. If you can plan your overwater flights at an altitude that will enable you to glide to land at all times, you are ahead of the game. Many aircraft manufacturers do not publish gliding data. Even if your handbook does have this information, it is a good idea to pull the power some time when you are crossing a pond and test the wings of your little land bird.

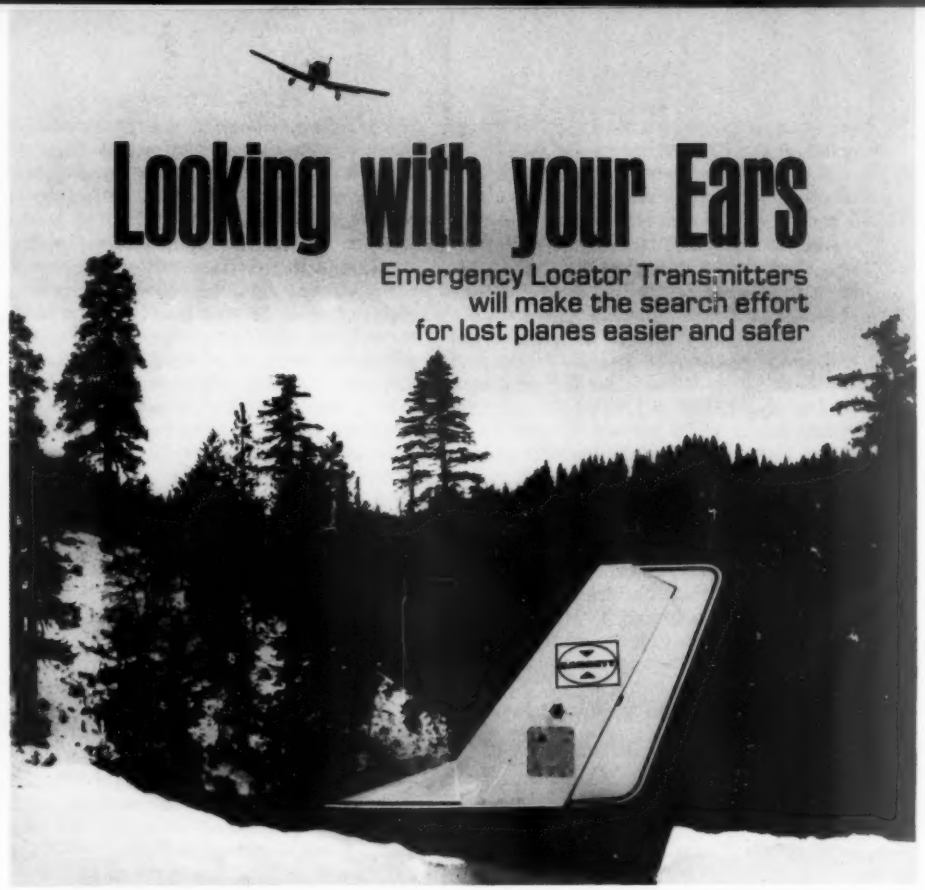
It may help you decide about buying life jackets. L.D.G.

Wheel-equipped airplanes were not designed for landing on water, but sometimes fate has other designs. How can you avoid--or if need be, survive--an unscheduled splashdown?

If a wheels-down splashdown on the open sea becomes unavoidable try to land as close as possible to the nearest boat. Make certain the occupants see you come down, and that they understand you need help.

Looking with your Ears

Emergency Locator Transmitters will make the search effort for lost planes easier and safer



In March of 1967 a single-engine private plane on a flight from Portland, Ore., to Red Bluff, Calif., crash-landed in the rugged Trinity Mountains of northern California. The three occupants, a couple and their teen-aged daughter, survived the crash, but all were injured. In spite of his injuries the man started walking for help. The two women who remained with the plane suffered a slow death from injuries and exposure. Although they had crashed only a few miles from civilization, the man apparently walked in the wrong direction for help. His body has never been found.

Forty miles farther south on the same mountain ridge in May of 1971 the story was re-enacted—but this time the ending was happier. Spelling the difference between life and death was a pocket-sized gadget called an emergency locator transmitter (ELT).

The ELT is a compact, lightweight, self-contained transmitter, designed to be carried in an aircraft. Its single purpose is to broadcast a distress signal to aid searchers in finding a plane after a crash or forced landing. Under a Federal Law (P.L. 91-596, Section 31) ELTs will be mandatory on virtually all new general aviation delivered in the U.S. after December 1971, and other planes must have them by December 1973. (Specifically named exceptions are jets, military planes, aerial applicators, helicopters, and planes used solely for training within 20 miles of their home base.)

An FAA proposal would require the units to be mounted on the airframe, and to be capable of being activated both manually and automatically by means of an inertia switch. Minimum power would be 75 milliwatts, enough to broadcast more than 50 miles for at least 48 hours under most circumstances. Final version of the FAA rule is expected to be published shortly. (See "Lost and Go Seek," FAA AVIATION NEWS May 1971.)

ELT Summoned Help

The second accident in the Trinity Mountains occurred during the 1971 Memorial Day weekend when a Piper Cherokee, en route to Concord, Calif., crashed onto a rugged hilltop while the pilot was attempting to let down through an overcast. The plane skidded over the crest, bounded back into the air, and then dropped into thick manzanita, suffering considerable damage and losing both wings in the process. On board were four college students, two of them licensed pilots. The one girl in the group carried in her purse behind the back seat a personnel-type manually operated emergency locator transmitter, which the pilots had bought jointly for $200 for cross-country flying. They had given it to her to hold and after regaining consciousness she retrieved and activated it.

The VFR flight plan called for an 11:05 p.m. arrival time, and an Alert Notice was issued by FAA promptly half an hour after that time when the plane failed to close the plan. Early Saturday morning several pilots reported hearing a distress signal in the area of Red Bluff, Calif. At 7:43 a.m. the Search and Rescue Center at Hamilton Air Force Base north of San Francisco dispatched a search plane.

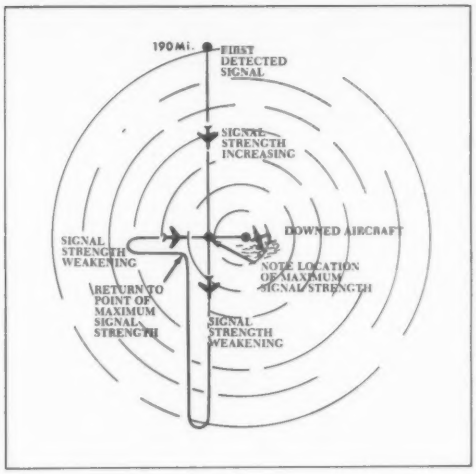
By 9:02 a.m. Saturday (less than 12 hours after the crash) it had pinpointed the location of the signal. Two paramedics parachuted through an overcast (700 feet stratus with layers to 4,000 feet) and landed three miles from the scene of the accident. At the crash site they found all four victims alive, although one had broken both legs. Suffering from exposure, they were removed by rescue helicopter and ambulance to a local hospital. Doctors there doubted whether the lightly dressed victims could have survived another night of bad weather on the mountain.

The emergency locator transmitter undoubtedly played an important part in saving these lives. It would have been a virtual impossibility for the rescue helicopter pilot to find the crash site without the ELT; the wreckage would have been extremely difficult to spot from the air, even in clear weather, because of the rugged terrain and the position of the plane in and under the trees. (As it was, the weather was so bad and the country so rugged that one of the medics was injured when he landed in a tree after his jump through the overcast.)

This dramatic story is only one of many ELT "saves" which are being reported as the use of the locator beacon becomes more common, and it is a story that will almost certainly be repeated with increased frequency in the future when most of the general aviation fleet is ELT equipped. FAA is already at work on a monitoring system to listen for the distress signals, since few of them will have the range to reach present ground-based facilities.

A needle in a haystack could be easy to find compared to a downed plane in the rugged northwest. Forest Service fire watch towers would make ideal receiver stations for ELT distress signals.

Several plans are under consideration and some, perhaps all, of these will be used in time. One proposal involves a network of ground-located VHF receivers installed at strategic locations across the country. Since they will be most needed in remote and



A pilot with VHF radio seeks out a transmitting locator through a trial and error technique of flying to the point of loudest reception and listening to the signal "build" or "fade" as he reverses course. Below —victims of this accident were rescued by a helicopter with the aid of the ELT in the downed plane, FSS direction finding equipment and two-way radio. Visibility was only one-fourth mile in smoke from a forest fire. The crash had occurred near the airport during a special VFR approach at Pangborn Field, Wenatchee, Wash. in September 1970.

rugged areas, the fire watch towers of the U.S. Forest Service seem ideally suited.

A consideration for the future calls for the use of an orbiting satellite to pick up all ELT signals and relay them to a central control point.

In any event, general aviation pilots will probably be asked to voluntarily monitor the emergency frequency for a few minutes out of each hour. (Military aircraft monitor their 243.0 MHz emergency frequency routinely.) A suggested and simple routine would be for pilots to switch to the emergency frequency briefly after listening to the weather broadcast twice hourly.

A vital link in the ELT picture obviously is the search and rescue program. Most civilian search missions are conducted by the Civil Air Patrol. The CAP is preparing for the age of the electronic search by holding training missions using the electronic devices, and by equipping at least some of their search planes with airborne VHF direction-finding units called "crash position indicators" (CPI). These cost the CAP about $300 each and work roughly on the principle of the automatic direction finder, with a needle that points to the transmitting unit.

Even without special equipment, however, any pilot who picks up the signal of an emergency transmitter can do much to help bring assistance to a downed plane. Even an inexpensive portable would serve his purpose—it need not have transmitting capability.

First—and most important—the pilot who picks up the distinctive signal should advise someone on the ground, at once, what he has heard and exactly where he has heard it. This would preferably be a Flight Service Station, but it could be a Center, Tower or any other facility with which he is in contact. Proper authorities would then be notified and a search and rescue mission instituted. This is all a pilot is expected to do after hearing the signal. Individual pilots untrained in search procedures are not encouraged to embark on a solo search for a downed aircraft for the obvious reason that this could result in two lost planes rather than one.

Civil Air Patrol pilots are trained to use a "build and fade" technique to zero in on a target. The procedure is based on the premise that the closer you get to a broadcasting transmitter the louder the sound will be. The "build and fade" technique will be familiar to older pilots who have flown the "beam" of the radio range, but the younger generation of flyers—who cut their flying teeth on an omnirange—need a little more instruction to perfect the skill.

The search pilot flies along in an area where a plane is believed to be down. The volume, and squelch, of the VHR receiver are turned all the way up—loud. (This brings in a lot of static, but it minimizes his chance of missing the signal.) Suddenly he hears it!

"Eyoo eyoo eyoo eyoo eyoo eyoo!"

It is so faint at first that he wonders if it is his imagination, but no, it is getting louder, and he knows it is the real thing. It is an arresting sound—like a siren only faster and higher pitched: once heard, it can never be forgotten. Now the search pilot can turn down the volume and squelch on the radio. (Keeping the sound turned low during the search helps to determine quickly when the signal "builds" and when it "fades.")

Although the tracking procedure is a fairly simple one, there are a few rules to follow for the quickest, most foolproof manner of "boxing in" the transmitting signal. On his first leg, the searcher continues to fly in a straight line as the signal builds, then fades out completely, dutifully noting the times involved. Then he makes a 180° turn, and retraces his flight path as exactly as possible (on a reciprocal heading) to the point of maximum reception. (This will be about midway between the location where he first heard the signal and the place where he lost it.)

At this point he turns 90° in either direction and flies a straight course. If the sound fades, he knows he has guessed wrong, and so he reverses course. He holds this course until the volume builds to a peak and begins to fade. Again he retraces his course to the point of peak reception, makes another 90° turn and repeats the procedure. (If it sounds like an electronic version of the old "warmer-colder" game you played as a child, that is correct.)

Once the signal has been picked up, each leg is flown at a lower altitude. At higher levels the range of reception is greater, but as the search proceeds pinpointing the location of the target becomes paramount, and this can be done more accurately at low altitudes. When the search aircraft has successfully "boxed in" the target, ground searchers will take over.

Safer Searching Technique

CAP experts feel that with a little training and experience a pilot with VHF receiver can pinpoint the location of a transmitter (to within a square mile or so) in less than an hour, and with direction-finding equipment, the time could be cut even further. For the search pilot this new type of mission is less dangerous than the old visual method, since this one involves primarily a "listening" technique, during which the pilot can give much of his attention to flying the airplane safely at a higher, and safer, altitude than is normally used during a visual search.

Helpful as electronic locator transmitters are, FAA's Air Traffic Service is emphasizing that the ELT is meant to *augment*, not replace, present good safe operating practices such as filing a flight plan and making frequent radioed position reports in remote areas or over water. It is the use of the locator *in conjunction with a flight plan* (which automatically minimizes delay in starting a search) that is expected to produce the most dramatic saving of time between crash and rescue.

With or without an ELT the pilot's failure to file a flight plan can create a tragically long delay in starting a search. (In the recent East Coast crash in which war hero Audie Murphy was killed, the search was delayed 48 hours because no flight plan had been filed.)

Air search rescuers can best help those who help themselves. **R.T.**

Famous
FLYERS

Harriet Quimby's accomplishments proved she was not nearly as fragile as her nickname or her appearance would indicate.

the CHINA DOLL

The flying career of the first licensed U.S. woman pilot lasted less than a year, but left an indelible mark on aviation history.

A magazine article in *Good Housekeeping Magazine* in 1912 described flying as an ideal sport for women—an unusual statement for a period when skirts fell below the ankle and few professions were open to women outside of the home and the theater. But the author of the article was a forerunner of the women's liberation movement, whose credentials included the first pilot's license granted a woman in this country, as well as good looks and youthful buoyancy. Her flying career lasted less than a year, but she managed to establish a world record before being catapulted to her death in a tragic mishap, the exact cause of which remains a mystery to this day.

Born in the small California town of Arroya Grande in 1884, Harriet Quimby early determined that being a female would not hinder her professional ambitions. She was educated as a journalist, found herself a reporter's job on a San Francisco newspaper and soon afterward moved to New York. By the time she was 26 she had talked her way into the job of drama editor for the illustrated magazine *Leslie's Weekly*, a somewhat sensational tabloid.

Not content with the world of make-believe, Harriet became enamoured of aviation in 1910, after a visit to the Belmont Race Track, site of an international air race won by the pioneer flier John Moisant. Moisant impressed Harriet as the epitome of the modern romantic hero, although he was killed in an airplane crash a few months later before the two actually met.

Nevertheless, Harriet enrolled in the Moisant flying school at Garden City, Long Island. Her fellow student, and keen competitor for the honor of becoming the first official female pilot, was Mathilde Moisant, sister of the late John. Harriet was awarded her certificate by the Federation Aeronatique Internationale on August 2, 1911, two weeks ahead of Mathilde.

At once Harriet set out to capitalize on her achievement. Two days later she made a night demonstration flight at Dongan Hills, Staten Island, that drew a crowd estimated at 20,000 persons. She participated in air races and state fairs, and soon became a primary attraction. Her individualism was reflected by her "uniform," which usually consisted of trousers tucked into high laced, white-topped boots and a long-sleeved blouse made of plum-colored satin, with a choker collar and hood.

One of the favorite sobriquets bestowed on her by the press was that of the "Dresden China Aviatrix," or the "China Doll," possibly because of her good looks, diminutive stature and fair skin. She was encouraged by *Leslie's Weekly* to continue flying, and she wrote enthusiastic articles about aviation as the most wonderful of all sports—and the safest.

Believer in Omens

At the same time, she shared the superstitions of many pilots and always wore her plum-colored flying suit for luck, as well as a special antique bracelet and necklace. She carried about with her a small brass Hindu idol, which she named "Ganesha," given her by a French pilot with a warning about the fickleness of foreign gods.

With a journalist's flair for the dramatic and spectacular, Harriet decided to make an aerial crossing of the English Channel, first accomplished by Bleriot in 1909, three years earlier. The feat had been duplicated many times, but never by a woman—why not? Harriet acquired a new 70 hp Bleriot monoplane in France, had it ferried across to Dover, and on April 16, 1912, took off for Calais, France.

The distance was only 22 miles, but it was over water, which meant not only no place to land but nothing to steer by, especially in the foggy conditions that developed. Harriet had been warned by veteran French and British pilots of the certain death that awaited her if she were blown off course over the stormy North Sea and had advised her to learn to use a compass—a new experience for her.

Fortunately she was a quick learner and was able to make her course good under solid instrument conditions, flying at 6,000 feet in a vain effort to climb over the weather. Descending toward the French coast, she finally broke out of the clouds at 1,000 feet and was delighted to see the white sandy beaches of France below her. She never did find Calais, but settled for a field near the fishing village of Hardelot.

Unfortunately for her ambitions, her arrival was untimely. Two days earlier the *Titanic* disaster had taken place, and the newspapers of the world had no space in their columns to do more than mention her flight. She returned to the United States without the heroine's welcome she had dreamed of, disappointed but still eager to prove that aviation was by no means for men only. It was less than a year since she had won her wings, but she was impatient for recognition from the press. In her vexation, she had the head of her Hindu idol "Ganesha," lopped off, apparently on the assumption that this would change her luck. For whatever reason, her luck changed—drastically.

It happened over Boston Harbor on July 1, 1912. Harriet was competing in an air meet, still flying the Bleriot monoplane that had carried her across the English Channel. With a passenger, William Willard, manager of the air meet, riding in the back seat, Harriet was on the return leg of a flight to Boston Light. At an altitude of about 1,000 feet, the nose of the aircraft was seen to pitch down violently—so violently that Willard was thrown out of his

seat, falling to his death in the harbor before the eyes of thousands of spectators.

The Bleriot levelled off momentarily, as Harriet regained control, but then pitched down again and flipped over. This time it was the pilot, the diminutive China Doll, who was flung out of the airplane and plunged into the water. Rescuers who pulled the two bodies out of the bay thought that they detected a spark of life in Harriet, and a doctor and several first aid men worked over her frantically in vain. She had given her last performance.

The newspaper headlines that had eluded her in life now loudly proclaimed the courage and daring of the nation's first girl flyer. The flight across the Channel was reviewed in great length, and every detail of her flying career was embellished with newspaper prose. Her own articles were reprinted and read with great interest.

Perhaps nothing she wrote was as ironically touching as the statement that ". . . I never mount my machine until every wire and screw has been tested . . . only a cautious person—man or woman—should fly." For on that last tragic flight over Boston Harbor neither Harriet nor her passenger were wearing seatbelts. Most investigators at the scene concluded that an abrupt shift in balance, caused by Willard leaning forward from his seat, brought about the pitchdown that threw him clear.

With an unbalanced trim (the Bleriot normally required ballast in the rear seat when there was no passenger), Harriet apparently could not control the airplane, but had she been fastened in, there is always a chance she might have survived the landing. The China Doll was a lot tougher than she looked. W.S.

Miss Quimby, in the hooded plum-colored flying suit she wore for good luck, receiving farewells and last-minute advice before taking off across the English Channel.

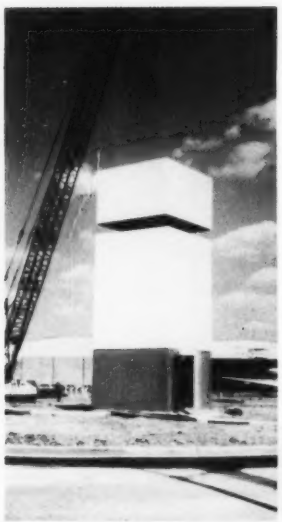
Pilot BRIEFS

■ LISTEN TO THE FOXTROT. Pilots using high activity terminal areas should be familiar with the Automatic Terminal Information Service (ATIS). This is a continuous broadcast of recorded information concerning ceiling, visibility, wind, altimeter setting, instrument approach, and runways in use. The current data is identified by a phonetic alphabetic code letter which is changed as the information is updated. Messages are broadcast automatically on the voice channel of the VOR located at the airport, or on a discrete VHF tower frequency and in some cases on the ILS localizer frequency. Much time can be saved in radio transmissions when departing or arriving pilots listen to the broadcast and inform the controller they have received the information by repeating the code word in the broadcast. Example: "Information Foxtrot received". The controller will bring them up to date on any last-minute changes in weather or field conditions.

■ FAST REBOUND. After two years of limited growth, aviation is expected to rebound in the next year, according to the latest FAA edition of "Aviation Forecast." The number of general aviation hours flown is expected to increase from the 25.5 million anticipated in Fiscal Year 1971 (the 12-month period beginning July 1, 1970) to 26.7 million in FY 1972. Over the 12-year period (1970-1982) covered by the forecasts, the number of hours flown annually in general aviation is expected to double, reaching 49.6 million in FY 1982, and the general aviation aircraft fleet will increase by 75 percent during the forecast period, from 130,806 in 1970 to 232,000 in 1982.

■ FOR GROOVY RUNWAYS. FAA has issued guidelines for installing and maintaining grooves in asphalt and concrete runway surfaces. Tests have indicated that grooving effectively reduces hydroplaning and improves the frictional characteristics of pavement surfaces, particularly in jet aircraft operations. Runway grooving as an important safety factor carries the highest program priority in the Airport Development Aid Program (ADAP). Copies of Advisory Circular AC 150/5370-8, Grooving of Runway Pavements, can be obtained free from DOT Distribution Unit, TAD 484.3, Washington, D. C. 20590.

■ OVERWEIGHT CHOPPERS. Operating helicopters in excess of the maximum certificated gross weight usually negates the established "time for life limited" for helicopter parts. Restricted category helicopters may be operated overweight only in accordance with manufacturer's data concerning increased weight and the flight envelope. FAA approval should be obtained at the local district office.



Control Towers Pre-Fabricated for G. A. Airports

Towers by the truckload became a reality with the completion of the first of three pre-fabricated control towers being built for the FAA for medium or small airports. First modular tower was dedicated at Owensboro, Ky., on June 19, 1971. Two others are now being built at Parkersburg, W. Va., and Columbus, Ohio (Don Scott Field).

Construction of the towers utilizes a new concept wherein components are completely finished at the factory, hauled to the site on trucks, hoisted with a crane and stacked like building blocks. As each piece is positioned, it is bolted into place. The hexagonal tower cab, preglazed and complete even to lighting fixtures, is shipped in two pieces and assembled before raising into place.

The tower is designed to withstand winds up to 150 mph and severe earthquake jolts. Tower cab contains 240 square feet of floor space and can be as high as 72 feet above the ground, depending on number of sections used. On the floor below is a facility chief's office, ready room and mechanical equipment space. Access is by elevator as well as stairway.

The pre-fab process results in considerable saving in time and money over the standard construction method. The Owensboro tower cost about $340,000 fully equipped and required about seven weeks of on-site work to complete.

Flying Administrator Reports on Aircraft Performance

General aviation and air carrier aircraft are getting a hard, close look from FAA Administrator John H. Shaffer, who lately has been spending many hours in the cockpit in addition to long days behind a desk.

In a space of fewer than 60 days the Administrator, a bomber pilot in World War II, has flown the Beechcraft *Baron, Queenair,* and *Kingair,* the *Learjet, Gulfstream,* Boeing 737, McDonnell-Douglas DC-10 and the Cessna *Citation.*

Mr. Shaffer was particularly pleased with the smokeless emissions and the relatively low noise output of the fanjet engines of the *Citation* and the DC-10, aircraft now being certificated under the new FAR Part 36 which specifies limits of acceptable engine noise. Both aircraft are reporting noise levels well below the regulatory limit.

He predicted that the quieter, cleaner characteristics of the new aircraft would do much to improve relationships between airports and communities concerned about industrial noise and smoke.

John H. Shaffer, FAA Administrator

Flight Instructor Wins Powder Puff Derby on 19th Try

Experience and persistence paid off for Mrs. Gini Richardson, a veteran pilot and flight school operator from Yakima, Wash., who after 19 years of trying won first prize in the 2,400 mile Powder Puff Derby. The international race, from Calgary, Alberta, to Baton Rouge, La. started on July 5 and ended July 8.

Mrs. Richardson won the $10,000 award by averaging 207.7 mph for a score of +27.7 in a Cessna 210J which she flew alone. Second prize went to a California team, Marian Banks of San Diego and Dottie Sanders of Santee in a Comanche 260. In third place were Jan Gammell of Denver and Ilovene Potter of Seattle, also in a 260 Comanche.

The Derby is a speed race, with scores representing the difference between the par speed handicap for each type of aircraft and the average groundspeed over the course. The enviable safety record of no serious accidents in 25 years is attributed largely to observance of safety-oriented race rules. Men may not participate.

This year's entrants numbered 274 pilots in 144 planes, including 55 grandmothers (cheered on by 189 grandchildren) and six mother-daughter teams.

New Seat Belt Rule in Effect

Pilots of all aircraft, including small private planes, will be responsible for seeing that all occupants have their seat belts fastened during takeoff and landing under a new rule which has been adopted by the Federal Aviation Administration, effective August 30, 1971.

This requirement in the past has applied only to airlines or commercial or air taxi operators of large aircraft. The only rule pertaining to small planes specified that safety belts be provided for all occupants. The new rule will affect 130,000 civil aircraft including experimental craft and gliders, but would not apply to "airships." Children under two years of age may be held on the lap of another properly belted passenger.

Landing Facilities Increase

The number of airports in the U.S. continued to climb in 1970. FAA records show 11, 261 airports, heliports and seaplane bases as of December 31, 1970, a net increase of 211 over the 11,050 reported at the end of 1969. Included in the new total are 790 heliports and 431 seaplane bases.

Publicly-owned landing facilities number 4,260, and 7,001 are privately owned and operated. Texas leads all other states with 982 facilities, followed by California with 730 and Alaska with 708. Scheduled airline service is provided at 786 airports.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Rockets Away

With a great deal of interest, I read the April 1971 issue of FAA AVIATION NEWS, particularly the article "Flight of the Squirt."

The reason for my fascination is the reference in the first paragraph to the flight of the Chinese gentleman in the Ming dynasty. For quite some time I have had in my possession a copy of an original etching by Larry Toschik, which displays the lighting up of the rocket in the premature flight. My secretary always thought I was kidding her until, with a great deal of delight, I was able to show her the article. Now she is convinced that it actually happened.

Virginia Hash
Phoenix, Arizona

• IFR Assistance for All

I agree with Donald Organ's letter in the November issue of FAA AVIATION NEWS concerning special code for new or weekend instrument pilots. Certainly most novice instrument pilots do understand the system. The only thing lacking is the everyday exposure and the confidence that follows. Would not a simple statement under "Remarks" in the flight plan suffice, instead of a special code, and would not the controller welcome this information? I would think it would be easier for him (and pilot) if he knew he was directing a professional rather than one newly rated.

Dr. John DeMeo
Newburgh, N.Y.

Pilots are encouraged to tell the controller their level of experience by requesting that clearances be issued at a slower speech rate, radar positions be provided, radar vectors to a fix or an airway, etc. Controllers will generally honor such requests depending on their workload at the time. Student pilots are not the only ones to ask for assistance. We believe that this assistance is best provided on an informal basis. Let the controller know informally about your lack of experience. He is certain to assist in every way possible.

• Availability of Order Forms

In the May 1970 issue of FAA AVIATION NEWS there were several suggestions for expediting orders of publications from the U.S. Government Printing Office. One of them was to use the order form contained in "FAA Publications." It would have been much easier if you had published a copy of the order form in FAA AVIATION NEWS. May I suggest that you do this the next time you list the current status of the FARs.

Richard M. Guernsey
Caldwell, N.J.

A good suggestion except that we simply have no space in the magazine for order forms. However, we are looking into the possibility of having a supply of order forms available in FAA regional offices and local field facilities. If this can be done, you will be notified through this magazine.

• Top vs Major Overhaul

Please print a definition for the often used terms "major overhaul" and "top overhaul" as applicable to aircraft engines.

J. B. Hill
Williamsport, Pa.

As industry applies the terms, a top overhaul of a reciprocating engine includes the repair of cylinder assemblies including the pistons and piston rings. A major overhaul is the complete disassembly of an engine, its repair, reassembly and testing to assure proper operation. FAA requires that the work accomplished meet the performance rules set forth in Section 43.13 of the Federal Aviation Regulations.

• Where Did All the Oxygen Go?

In browsing through some past issues of your magazine, I was surprised to read in an article on a smoke tunnel (FAA AVIATION NEWS, February 1966) that air contained 20.95 parts of hydrogen and no oxygen. What surprised me even more was that no notice was taken of this error in the Forum page.

A. R. Novy
Johnson City, Tenn.

Fortunately for all of us, the error was only typographical. It should have read oxygen 20.95. The amount of hydrogen in the air is infinitesimal.

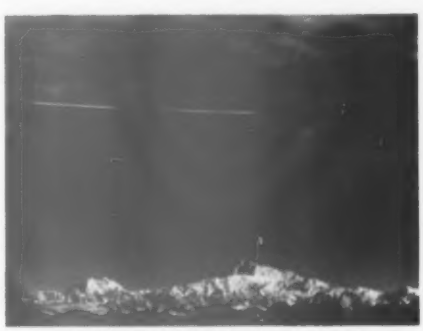
• Icing Tips from Taylorcraft Seeker

In the very informative article "Winter Cough" in the November 1970 issue of FAA AVIATION NEWS, you failed to mention a method of determining when to be especially alert for carburetor ice that was given me by an FAA FSS operator: Use the temperature/dew point information as found in the hourly sequence reports put out by FAA and the Weather Bureau. When the temperature and dew point are within five degrees of each other, look out for carburetor ice. I have repeatedly checked this bit of information and found it to be accurate.

Another point not mentioned in the article is that while carburetor ice problems are most prevalent in the winter in the contiguous 48 states, it is more of a problem in the *summer* in Alaska and northern Canada. Persons planning to fly to northern areas should be alerted to this fact.

I wonder if some of your readers can help me locate a usable Taylorcraft/Auster (130 hp version of the L-2 Taylorcraft built by Auster for the RCAF and RAF during World War II.)

H. J. Yost
P.O. Box 217
Turner, Oregon 97392



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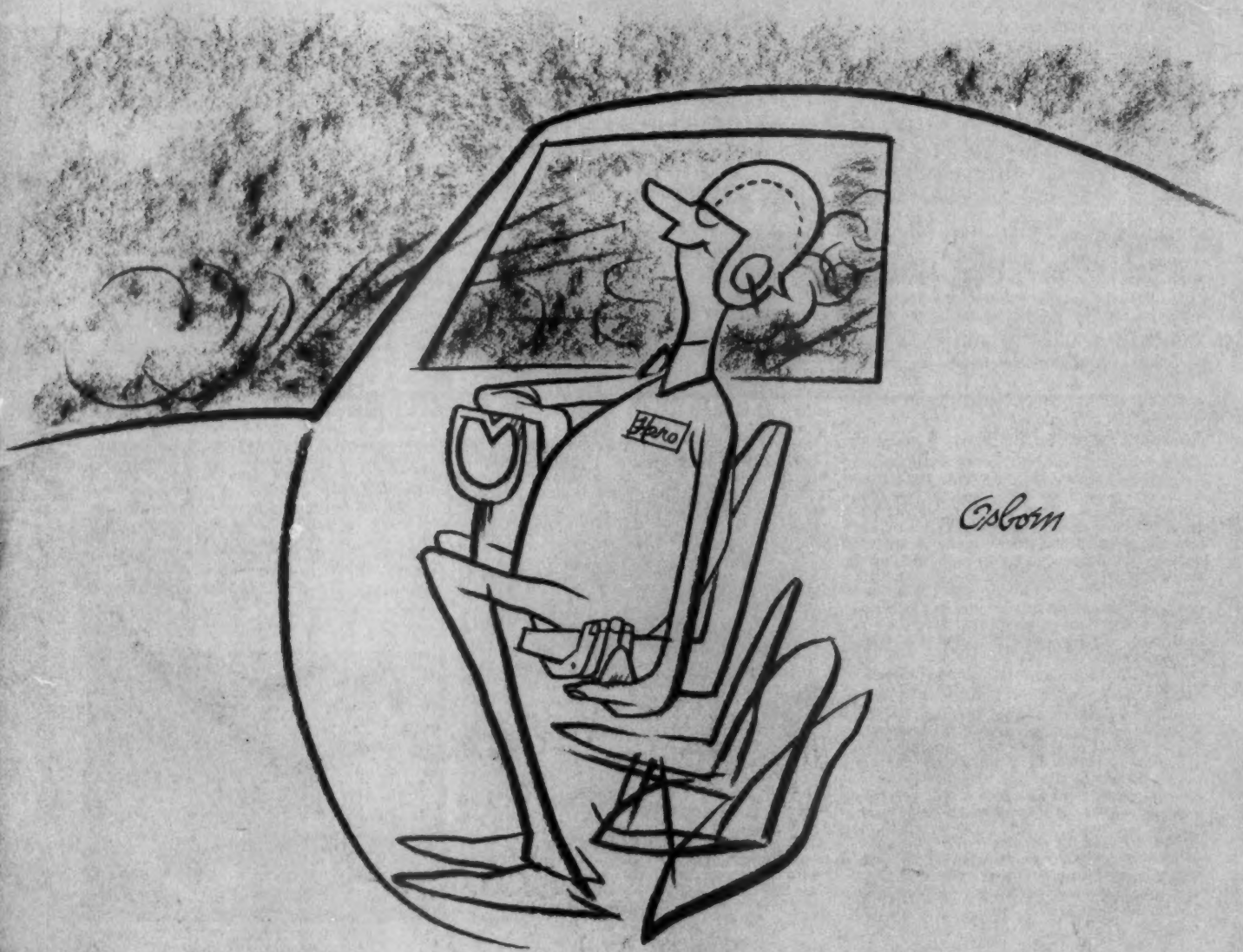

Flying blind by the seat of your pants

Suggested by Larry C. Larkin
FSS, Tulsa, Oklahoma